Testing the relationship between FDI inflow and out flow in India: a critical analysis

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ABSTRACT

This study examines the factors determining FDI inflow and outflow from India using annual data set from the period 1980-2009. More over the study has tested whether FDI inflow has any role in determining FDI out flow and vice versa. The study used stepwise regression for finding the determinants. Trade openness (Trade as a percentage of GDP), Gross Capital Formation, economic stability (Lending Rate as the proxy for economic stability) and FDI outflow are found to be the major factors determining FDI inflow in India. In case of FDI outflow labour cost (workers remittance and compensation of employees received in US $ is taken as a measure of labour cost), market size (GDP in current US $), economic stability (Lending Rate as the proxy for economic stability), Gross Capital Formation and FDI inflow are the major factors that determines FDI outflow in India. And more over FDI out flow has a role to attract FDI inflow to the country.

Key words: FDI inflow, FDI out follow, India, GDP, FDI

INTRODUCTION

One of the basic requirements of any developing countries is capital. They require capital for investing in infrastructure development, industrialization and for creating employment opportunities. Most of the developing countries are not self equipped to finance for all these areas. This situation forces the countries to go for attracting FDI and FDI becomes the major indictor for economic growth in the developing countries. If we see the trend of FDI inflow to India there is a significant increase over period of time through various kinds' investment

After the liberalization the growth of FDI inflow was quite high. At the same point of time Indian economy growing faster than pre liberalization period than in post liberalization period. FDI inflow not only leading to investment but also it will enhance our FOREX reserve. At one point of time we was struggling to get Dollar for our foreign trade. But today India has sufficient FOREX reserve for the same through the growth in FDI inflow. Mauritius (41.9%) is the highest contributor of FDI to India followed by Singapore (9.18%), U.S.A (7.36%) and U.K (5.01). Table: 1 shows the top ten contributor of FDI to India.

Table: 1 STATEMENT ON COUNTRY-WISE FDI INFLOWS FROM APRIL 2000 TO JANUARY 2011

Amount of Foreign Direct Investment Inflows

S.NO	Country	(In Rs crore)	(In US$ million)	%age with total FDI Inflows*
1	MAURITIUS	238,876.20	53,368.91	41.9
2	SINGAPORE	51,963.99	11,693.83	9.18
3	U.S.A	42,190.39	9,370.69	7.36

4	UNITED KINGDOM	28,298.45	6,387.08	5.01
5	NETHERLANDS	24,877.41	5,534.70	4.35
6	JAPAN	23,074.84	5,081.56	3.99
7	CYPRUS	21,235.09	4,654.74	3.65
8	GERMANY	13,012.80	2,918.42	2.29
9	FRANCE	10,067.92	2,220.07	1.74
10	UAE	8,525.84	1,875.09	1.47

source: RBI bulletin

After the liberalization of Indian economy lot of Indian companies are started investing in foreign countries. Policies of the Indian government also encourages to Indian companies to go for investment in foreign countries. Because indirectly through this Indian government can earn foreign money trough profit generated out of this investment.

TABLE 2: FDI INFLOWS AND OUT FLOW TO INDIA

year	FDI inflow	FDI out flow	year	FDI inflow	FDI out flow
1980	451.75	78.07	1995	5640.81	495.24
1981	543.67	80.07	1996	8165.81	735.24
1982	615.75	81.07	1997	10630.1	617.29
1983	621.39	86.07	1998	14065.36	705.78
1984	640.63	90.07	1999	15426.1	1707.32
1985	746.72	93.07	2000	16338.95	1733.48
1986	864.45	92.07	2001	19675.92	2531.75
1987	1076.77	97.07	2002	25826.28	4070.58
1988	1168.02	108.07	2003	32549.19	6073.15
1989	1420.12	118.07	2004	38060.24	7734.42
1990	1656.81	124.07	2005	43201.58	9741.3
1991	1731.81	113.07	2006	70870.28	27035.64
1992	1983.81	293.89	2007	105790.5	44080.35
1993	2515.81	294.24	2008	62451.35	62451.35
1994	3489.81	376.24	2009	77206.98	77206.98

Source: UNCTAD data set.

Table 2 presents the outflow and inflow of FDI from india to different countries over a period of time and it is evdent from this table that FDI outflow has started after the liberaliztation. In recent years FDI out flow has been showing a consitent increase. There are three major ways a country can ean foreign money. One is through attracting FDI form other countries, second is through foreign trade and the third most important way of getting foreign money is return of outward FDI.

India is having a lot of potential for attracting the FDI. There are lot of reaon for this like market size, huge population, Low labor cost, stable economic growth, favorable rules and regulations

for investment etc. The below Table 3 and 4 shows the allocation of FDI investment in various industries in India.

TABLE 3: SECTOR ATTRACTING HIGHEST FDI INFLOW

Rank	Sector	% of cumulative FDI inflow (from Aug 1991- Oct 2006) in US$
1	Electrical Equipments (including computer software & electronics)	17.94
2	Services Sector (financial & non-financial)	13.86
3	Telecommunications (radio paging, cellular mobile, basic telephone services)	9.96
4	Transportation Industry	8.94
5	Fuels (Power + Oil Refinery)	7.14
6	Chemicals (other than fertilizers)	5.52
7	Food Processing Industries	2.97
8	Drugs & Pharmaceuticals	2.93
9	Cement and Gypsum Products	2.45
10	Metallurgical Industries	2.07

source: RBI

Table 4: Sector attracting highest FDI inflow

Rank	Sector	% of cumulative FDI inflow (from April 2000- September 2010) in US$
1	Services Sector (financial & non-financial)	21
2	Computer software & Hardware	9
3	Telecommunications (radio paging, cellular mobile, basic telephone services)	8
4	Housing & Real Estate	7
5	Construction Activities	7
6	Power	4
7	Automobile Industries	4
8	Metallurgical Industries	3
9	Petroleum & Natural Gas	3
10	Chemicals (other than fertilizers)	2

source: RBI

These above tables are the clear indication towards the attractiveness of FDI inflow to India. Timely change in policy by the Government of India towards FDI investments in various sectors has played a good role in the attracting FDI in the various sectors.

In this context this study is focused to find out the major determinants of FDI inflow and outflow in India. As we found most of the study in the past address only the determinants of FDI inflow. In our study we are focusing to find out whether FDI inflow has any role in determining FDI out flow and vice versa.

LITERATURE REVIEW

Macroeconomic level studies

Carkovic and Levine (2002) - positive role for FDI in generating economic growth depends on the particular environments which includes among others achieving a threshold level of human capital, income level, a well-functioning capital market and openness to international trade. Borensztein et al (1998)- the country must have attained a sufficiently high level of development, especially as it relates to the accumulation of human capital. Xu (2000)- FDI brings technology and it translates into higher economic growth only when the host country has a minimum threshold level of human capital. Alfaro et al (2006), Durham (2004), and Hermes and Lensink (2003) find that countries with well-developed financial markets gain significantly from FDI in terms of economic growth. Bhagwati (1978) and Balasubramanyam et al (1996) stressed that trade openness is crucial for obtaining the growth effects from FDI. Balasubramanyam et al (1996) find that FDI enhances economic growth and this effect is relatively stronger for countries that pursue outwardly oriented trade policy.

Mankiw (2004) states that international trade affects economic growth; export expansion improves economy-wide efficiency in the allocation of inputs, and leads to total factor productivity growth. On the supply-side, Grossman and Helpman (1991) demonstrate that exports can positively contribute to economic growth through different means, such as facilitating the exploitation of economies of scale, or promoting the diffusion of technical knowledge.

Sen (2002) has emphasized that "the importance of global contact and interaction applies to economic relations among others and that there is much evidence that global economy has brought prosperity to many different areas of the globe and in overcoming pervasive poverty." Foreign investors play a significant role in enhancing global contacts through direct capital investment and international trade. Ranis (2000) demonstrated strong connection between economic growth and human development: economic growth provides the resources to permit sustained improvements in human development while improvements in the quality of the labor force are important contributors to economic growth.

Determinants

Balasubramanyam and Mahaambare (2003) state that FDI is the major source through which developing countries like India can acquire technology and knowhow. And the authors are argued that FDI is only one of the main indicators for economic growth. It will accelerate the overall development. Vijaykumar, Sridharan and Rao (2010) studied the factors determining FDI inflows of BRICS countries and found that Market size, Labour cost, Infrastructure, Currency value and Gross capital formation as the potential determinants of FDI. Ali and Guo(2005) examine the determinants of FDI in China and authors indicates from the market size and Labour cost are the main factors for determining FDI. Erdal and Tatoglu (2002) pointd out the major location related determinants of FDI inflows in Turkey. Market size infrastructure, openness of the economy and market attractiveness are the major location determinants of FDI inflow.

Wei (2005) examined the determinants of inward FDI in India and China and the causes for their huge difference and the author found that China is having higher FDI from the OECD countries because of the larger domestic market and higher international trade tie ups with OECD countries. But in case of India the advantage for attracting FDI inflow are cheaper labour cost, lower country risk, geographic closeness to OECD countries, and cultural similarity.

Kumar(2007) researched the trends and determinants of outward FDI flow from Indian enterprises and he finds that Accumulated learning and Managerial Skill, cost Effectiveness, Brand name, size of the company, Export orientation, Technological dependence and liberalizations of outward investment policy are the major factors determining outward FDI by Indian enterprises.

POTENTIAL VARIABLES DETERMINING FDI INFLOWS AND OUTFLOWS

Based on the discussed literature review, our study identified a set of potential variables determining FDI inflow. With the absence of study regarding the determents of FDI out flow this study takes the same variable for identifying the FDI out flow also.

Market size

Studies such as Lankes and Venables (1996), Resmini (2000), Nunes et al., (2006) indicates size of the market is expected to be a positively influence on FDI inflow of any country. Generally market size is measured by Gross Domestic Product (GDP), size of the middle class population and GDP per capita income etc. This study expects that market size will also positively affect FDI outflow.

Economic Stability and Growth prospects

Investors always look countries which are having stable macroeconomic condition and sustained economic growth rates for their investment. i.e., countries having stable economic growth will receive more FDI and vice versa. Duran (1999), Dassgupta and Ratha (2000) are taken the proxies for measuring the stable growth rate based on GDP growth rates, Industrial Production Index, interest rates, inflation rate etc. Inflation rate may negatively or positively affect the FDI inflow and outflow all other variable will affect the FDI inflow as well as out flow positively.

Labour cost

Cost of labour and investment has inverse relationship because it is directly proportionate to the total cost of production. This study expects that FDI inflow and outflow has negative and significant relation between the lobour costs. Lankes and Venables (1996), Resmini (2000), Nunes et al., (2006) have taken wage rate as a proxy for labour cost.

Trade openness

Lankes and Venables (1996), Resmini (2000), Nunes et al., (2006) these studies showing that Trade openness is one of the key determinant of FDI inflow. We expect that trade openness FDI inflows as well as FDI outflow are to be a positive determinant. Trade as a percentage of GDP is taken as a proxy for Trade openness.

Currency valuation

Currency is the medium for any kind of trade. Currency is varying from country to country. In this context the importance of exchange come in to picture. In this study we used real effective exchange rate (REER) as the proxy for currency valuation. Real exchange rate, nominal exchange rate also can be considered for the proxies of currency valuation and we expect that FDI inflows as well as outflow are positively determined by currency valuation.

Gross Capital Formation

Libor Krkosha (2001), lipsey (2000) in their studies they have mentioned that FDI is having little impact on capital formation in developed countries. Here in we are expect may be positive or negative impact on determining FDI inflow as well as outflow.

DATA AND MODEL SPECIFICATION

The data set consists of yearly observation for the period of 1980-2009 for India. The required data set for the country were obtained from World development indicator (WDI) website. FDI inflow and FDI out flow data are collated from United Nations Conferences on Trade and Development (UNCTAD) data set. Index of Industrial production obtained from Reserve Bank of India hand book of statistics.

The dependent variables in our study are FDI inflow (FDII) and FDI outflow (FDIO) in current US$. The independent variables of the study are identified from the past literature. Independent variable that are expected to determine the FDI inflow as well as outflow are Gross Domestic Product, inflation rate, real interest rate, lending rate, real effective interest rate, gross capital formation, Trade as a percentage of GDP and Wage rate. For finding the impact of FDI outflow on FDI inflow we are taking FDI outflow is one of the independent variable and vice versa.

For identifying the determinants of FDI inflow and FDI outflow the study proposes the following models.

$$FDII_t = \alpha + \beta_1(GDP_t - GDP_{t-1}) + \beta_2 GCF_{t-1} + \beta_3 INF_t + \beta_4 TRGDP_t + \beta_5 FDIO_t + \beta_6 WRCE_t + \beta_7 IIP_t + \beta_8 REER_t + \beta_9 RIR_t + \beta_{10} LEN_t + \beta_{11} D1 + \beta_{12} D2 + e_{it} - \quad (1)$$

$$FDIO_t = \alpha + \beta_1(GDP_t - GDP_{t-1}) + \beta_2 GCF_{t-1} + \beta_3 INF_t + \beta_4 TRGDP_t + \beta_5 FDII_t + \beta_6 WRCE_t + \beta_7 IIP_t + \beta_8 REER_t + \beta_9 RIR_t + \beta_{10} LEN_t + \beta_{11} D1_t + \beta_{12} D2_t + e_{it} - \quad (2)$$

Where,

α is the intercept and t is the time.

$\beta_1, \beta_2, \beta_3$ …….. β_{12} are the coefficients of independent variables.

$FDII_t$ is the Foreign Direct investment inflow in current US$ at time t.

$FDIO_t$ is the Foreign Direct investment out flow in current US$ at time t.

$(GDP_t\text{-}GDP_{t-1})$ is the Gross Domestic Product in the current US$ at time t-(t-1) and is the measure of market size.

GCF_{t-1} is the Gross Capital Formation at time t-1.

INF_t is the Inflation rate (annual percent) at time t.

$TRGDP_t$ is the Trade as a percentage of GDP at time t and is the measure of trade openness.

$WRCE_t$ is the Workers' remittances and compensation of employees received in US$ at time t and is the measure of labour cost.

IIP_t is the Index of Industrial Production at time t.

$REER_t$ is the Real Effective Exchange Rate at time t.

RIR_t Real Interest Rate at time t.

LEN_t is the Lending Rate at time t.

$D1_t$ is the Dummy variable that takes value 1 up to 2000 and 0 other wise.

$D2_t$ is the Dummy variable that takes value 1 up to 1995 and 0 other wise.

e_{it} is the error term over the time t.

RESULT AND FINDINGS

Before conducting any statistics analysis we have checked whether there are any structural brakes in between the period of the study. To test the existence of structural breaks we used Chow test and found that there are two structural brakes on 2000 and 1995. The result of Chow test is given in the table 5.

TABLE 5: CHOW BREAKPOINT TEST: 2000

F-statistic	5.014228	Probability	0.008858
Log likelihood ratio	53.82384	Probability	0.000000
Chow Breakpoint Test: 1995			
F-statistic	1.386768	Probability	0.307425
Log likelihood ratio	26.09821	Probability	0.00361

For taking in consideration of structural break we have put two dummy variables in the proposed model.

The second step we have run the linear regression analysis and found that the model is suffering from high auto correlation and multicollinearity. Therefore, we removed Index of industrial Production, Inflation rate and Real Effective Exchange Rate because of high multicollinearity. After removing these variables we have used Step Wise Regression Analysis for finding the determents of FDI inflow and outflow for avoiding the problem of multicollinearity. The result of Step wise regression analysis is shown in the Table 6 and 7.

TABLE 6: STEPWISE REGRESSION RESULT OF DETERMINANTS OF FDI INFLOW

Model	variables	Beta	Std. Error	t-value	VIF	Adj-Rsquare	F –value	Durbin-Watson
1	constant	-34280.7	4701.559	-7.29***		0.842	155.548***	1.886
	TRGDP	2188.9	175.507	12.472***	1.000			
2	Constant	-23664.4	5460.208	-4.334***		0.877	104.323***	1.886
	TRGDP	1597.134	251.257	6.357***	2.631			
	FDIO	0.451	0.151	2.991***	2.631			
3	Constant	-51187.4	4017.391	-12.741***		0.970	314.677***	1.886
	TRGDP	681.125	158.716	4.291***	4.322			
	FDIO	1.103	0.103	10.755***	5.003			
	GCF	1917.544	207.81	9.227***	1.909			
4	Constant	-17399	13649.96	-1.275		0.975	288.468***	1.886
	TRGDP	227.432	227.875	0.998	10.827			
	FDIO	1.236	0.106	11.61***	6.551			
	GCF	1977.399	189.941	10.411***	1.938			
	LER	-1723.53	671.005	-2.569**	3.871			
5	Constant	-7165	9009.217	-0.795		0.975	384.349***	1.886
	FDIO	1.327	0.054	24.48***	1.700			
	GCF	2069.774	165.853	12.48***	1.478			
	LER	-2242.63	423.913	-5.29***	1.545			

Note: * significance @ 10% , ** significance @ 5%,*** significance @ 1%

Dependent variable: FDI inflow (FDII)

In case of FDI inflow we obtained five set of models. All the five models are significant at one percent level of significance with high Adj- R square (0.842, 0.877, 0.970, 0.975 and 0.975 respectively for the five models). Durbin-Watson result shows that there is no evidence for autocorrelation. In first model only one variable TRGDP is obtained all other variable are excluded. TRGDP is positively significant at one percent for determining the FDI inflow to India. FDIO and TRGDP are obtained in case of second model others are excluded. Both the variables are positively determining the FDI inflow to India. From this it clearly evident that FDI out flow is one of the factors that determine the FDI inflow. In third model TRGDP, FDIO and GCF are obtained and others are excluded. All three variables are positively determining the FDI inflow to India. All variables are statistically significant at one percentage. In case of fourth model four variables are obtained others are excluded. TRGDP, FDIO,GCF and LER are the variables obtained, in this four variables TRGDP is not statistically significant. FDIO and GCF is positively significant at one percentage. LER is showing negatively significant at five percentage level of

significance. Therefore, it is evident that FDI outflow and Gross Capital Formation are positively determining the FDI inflow and lending rate is negatively determining the FDI inflow. In the last model three variables are obtained that are FDIO,GCF, LER. FDIO and GCF are positively significant at one percentage. LER is negatively significant at one percentage. Excluded variables are shown in appendix.

Model three and four having a little evidence of multicollinearity others are satisfactory. So from the above table 6 it is evident that TRGDP, FDIO, GCF and LER are the major factors that are determining FDI inflow to India. Structural brake doesn't have any impact on determining FDI inflow.

TABLE 6: STEPWISE REGRESSION RESULT OF DETERMINANTS OF FDI OUTFLOW

Model	variables	Beta	Std. Error	t-value	VIF	Adj-Rsquare	F -value	Durbin-Watson
	Constant	-3575.73	1890.822	-1.891**				
1	WRCE	1.83E-05	0.000	10.969***	1	0.811	120.311***	2.116
	Constant	-1743.54	1705.253	-1.022				
	WRCE	1.17E-05	0.000	4.800***	2.907			
2	GDP	827.044	245.696	3.366***	2.907	0.867	88.015***	2.116
	Constant	-1619.92	1031.392	-1.571				
	WRCE	-5.08E-06	0.000	-1.797	10.81			
	GDP	1434.522	172.605	8.311***	3.923			
3	FDII	0.474	0.069	6.916***	5.328	0.953	176.389***	2.116
	Constant	-27472.8	6618.789	-4.151***				
	WRCE	-1.90E-06	0.000	-0.788	12.188			
	GDP	1231.007	147.646	8.338***	4.471			
	FDII	0.512	0.056	9.177***	5.489			
4	LER	1615.486	410.357	3.937***	2.165	0.971	209.935***	2.116
	Constant	-29405.4	6102.777	-4.818***				
	GDP	1135.529	83.774	13.555***	1.461			
	FDII	0.48	0.038	12.791***	2.517			
5	LER	1724.22	383.641	4.494***	1.921	0.970	283.843***	2.116
	Constant	-3959.22	10049.399	-0.394				
	GDP	429.641	247.254	1.738*	16.61			
	FDII	0.63	0.060	10.488***	8.43			
	LER	1523.931	342.416	4.451***	1.997			
6	GCF	-1004.76	336.108	-2.989***	12.024	0.978	280.099***	2.116

Note: * significance @ 10% , ** significance @ 5%,*** significance @ 1%

Dependent variable: FDI out flow (FDIO)

For finding the major determinants of FDI outflow from India the study runs stepwise regression and obtained six different models. All the six models are statistically significant at one percentage with high Adj-Rsquare (0.811, 0.867, 0.953, 0.971 0.970, 0.978 respectively for the six models). Durbin-Watson result shows that there is no evidence to support for autocorrelation. In case of first model WRCE is the only variables obtained, all others are variables are excluded. And this variable is positively significant at one percentage. For the second model two variables are obtained and all other variables are excluded.

WRCE and GDP are the two variables obtained. Both the variables are positively significant at one percentage. In case of third model three variables are obtained that are WRCE, GDP and FDII. GDP and FDII is positively significant at one percentage and WRCE is not showing significance. WRCE, FDII, GDP and LER are the four variables obtained in the fourth model. Except WRCE all other variables are positively significant at one percentage. In the fifth model three variables are obtained that are GDP, FDII and LER all the three variables are positively significant at one percentage. In the last model GDP, FDII, LER and GCF are the four variables obtained. GDP is significant at ten percentage and all other variables are positively significant at one percentage.

From the above table it is clear that the major factors that determine FDI outflow from India are WRCE, GDP, FDII, LER and GCF. All these factors are positively determining the FDI outflow. WRCE is positively significant in case of first and second model but in third and fourth model the co-efficient became negative and it's not showing significance. FDI inflow is having a significant role for determining the FDI outflow. In case of FDI outflow also structural brake doesn't have any impact.

CONCLUSION AND FURTHER SCOPE FOR RESEARCH

In recent years because of the larger market potential and economic growth FDI inflow to India from various countries and FDI outflow from India to other countries increased. However the factors determining the FDI inflow towards India especially FDI outflow from India are relatively less researched. And there is no study regarding whether FDI inflow has any impact on FDI outflow and vice-versa. This study made an attempt to identify these issues. With the help of stepwise regression the study finds major determining factors for FDI inflow as well as FDI outflow.

The study finds that Tread openness (Tread as a percentage of GDP), Gross Capital Formation, economic stability (Lending Rate as the proxy for economic stability) and FDI outflow are the major factors determining FDI inflow in India. In case of FDI outflow labour cost (workers remittance and compensation of employees received in US $ is taken as a measure of labour cost), market size (GDP in current US $), economic stability (Lending Rate as the proxy for economic stability), Gross Capital Formation and FDI inflow are the major factors that determines FDI outflow in India.

This study can be extended with increasing the number of countries as well as the period. In this study we have taken only few variables for identifying the determinants of FDI outflow. So the number of variables can be increased.

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